

**Notice of Allowability**

Application No.

10/820,294

Examiner

Andrew Schechter

Applicant(s)

LEE ET AL.

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the filing of 2 February 2006.
2. ☒ The allowed claim(s) is/are 1,2,4,6-9,13-15,17-19 and 23-30.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some\* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 3/28/05
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

**DETAILED ACTION**

**EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with James J. Merrick, Reg. No. 43,801 on 1 March 2006.

The application has been amended as follows:

**In the Claims:**

In claim 25, line 1, "according to Claim 23" has been replaced with --according to Claim 24--.

In claim 26, line 1, "according to Claim 23" has been replaced with --according to Claim 24--.

In claim 27, line 1, "according to Claim 23" has been replaced with --according to Claim 24--.

**In the Title:**

The title has been changed to "Liquid crystal displays with multi-domain effect formed by surface undulations".

**End of examiner's amendment.**

***Allowable Subject Matter***

2. Claims 1, 2, 4, 6-9, 13-15, 17-19, and 23-30 are allowed.
3. The following is an examiner's statement of reasons for allowance:

The prior art does not disclose the device of claim 1, in particular the limitations that the upper and lower substrates have first and second undulations, and (as amended from the previous claim 16, indicated as having allowable subject matter) the surface undulations are one-dimensional and have a period between  $\frac{1}{4}$  and 2 times the period of the pixels. Claim 1 is therefore allowed, as are its dependent claims 2, 4, 6-9, 13-15, 17-19, and 23.

The prior art does not disclose the device of claim 24, in particular the limitations that the upper substrate has a first undulation, the lower substrate has a second undulation in a direction different from that of the first undulation, and the liquid crystal is periodically arranged and has at least two pretilt angles in one period. Claim 24 is therefore allowed, as are its dependent claims 25-29.

The prior art does not disclose the device of claim 30, in particular the limitations that the upper substrate has a first undulation, the lower substrate has a second undulation in a direction different from that of the first undulation, wherein the first and second undulations form at least four multi-domains in one period of the unit pixel. Claim 30 is therefore allowed.

The closest prior art is discussed below (and in the previous office actions).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6,335,775 to *Iwamura et al.* discloses 1-D undulations on the substrates, but not having a period  $\frac{1}{4}$  to 2 times the period of the pixels, or 2 pretilt angles in one period, or at least 4 multi-domains in one period.

U.S. Patent No. 6,549,256 to *Bryan-Brown et al.* disclose a 1-D surface modulation, but on only one substrate.

U.S. Patent No. 6,476,894 to *Kikkawa*, U.S. Patent No. 6,549,257 to *Liu*, U.S. Patent No. 6,567,144 to *Kim et al.*, and U.S. Patent No. 6,753,551 to *Cheng* disclose various protrusions on the substrates, but not grating films having surface undulations as recited.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Andrew Schechter  
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1 March 2006